

Application No. 10/768,568

REMARKS

Claims 56-91 are pending in the application with claims 56, 61, 62, 67, 68, and 73-75 amended herein. Applicant expresses appreciation for the allowance of claim 81. The amendments to claims 56, 61, 67, and 73-75 are not related to the statutory requirements of patentability and now more positively express limitations that were previously inherent in such claim(s). Accordingly, they are not for the purpose of narrowing and do not effectively narrow the scope of any claim.

Claim 61 and 76 stand objected to because of informalities. Claim 61 is amended herein as suggested in the Office Action. Applicant notes that the method set forth in claim 76 is not limited to the order of the steps presented in claim 76. That is, the passivation layer is not necessarily formed over the material when it is in an oxidized state. At least paragraphs 31, 33, and 45 of the present specification disclose oxidation of the material as possibly occurring after forming the passivation layer. Accordingly, the suggested amendment of claim 76 is not justified. Applicant requests withdrawal of the objections in the next Office Action.

Claims 67 and 73-75 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite. Without admitting to the propriety of the rejection, the term "perovskite-type material" appearing in claims 61, 67, and 75 is amended to "perovskite-type crystalline structure" which clearly possesses antecedent basis and is consistent with the present specification. The term "outer portion" appearing in claims 73 and 74 is amended to "material" as suggested in the Office Action. Applicant requests withdrawal of the rejections in the next Office Action.

Claims 56-61 and 76-80 stand rejected under 35 U.S.C. 102(b) as being anticipated by Miyashita. Applicant requests reconsideration.

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Claim 56 sets forth a method that includes, among other features, oxidizing only a first portion of a material, converting, separately from oxidizing the first portion, at least a part of the oxidized first portion to a perovskite-type crystalline structure, and oxidizing, separately from the converting, a second portion of the material beneath the oxidized first portion. Pages 3-4 of the Office Action allege that Miyashita discloses each and every limitation of claim 56. Applicant traverses.

Pages 3-4 of the Office Action allege that several of Figs. 1(1) to 1(7) disclose the method of claim 56. However, review of the text of Miyashita describing the subject matter of such Figs. does not reveal any support of the Office's allegation. Instead the express text of Miyashita directly contradicts the Office's allegation. Applicant's note that the steps of the claim 56 method refer to each other and, thus, denote a particular order. For example, a first portion of the material is oxidized but another part (the second portion) is not oxidized until after oxidation of the first portion. This requirement inherently exists because oxidation of the second portion occurs beneath the oxidized first portion.

Page 4 of the Office Action alleges that Miyashita Fig. 1(2) discloses the claimed oxidation of the second portion beneath the oxidized portion. Miyashita page 5, lines 25-42 state that Fig. 1(2) shows heating and sintering of porous thin gel film 13 converting it to a crystalline metal oxide film 14. Review of all the Miyashita text and figures does not reveal any disclosure that gel film 13 is beneath an oxidized first portion during the heating and sintering. The Office Action does not reference by page and line number (or otherwise) any part of Miyashita supporting the allegation. None of the other Miyashita figures disclose any heating and sintering of gel film 13 occurring beneath an oxidized first portion. Accordingly, Applicant asserts that Miyashita fails to

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disclose the claimed oxidizing a second portion of the material beneath the oxidized first portion. At least for such reason, Miyashita does not disclose each and every limitation of claim 56.

In addition, the Office Action seems to imply, without expressly stating it, that the heating and sintering (page 5, lines 25-59) to produce the Miyashita structures of Figs. 1(2) and 1(6) discloses the claimed oxidizing. Certainly the Office Action cannot allege that the annealing (page 6, lines 5-22) to produce the Miyashita structure of Fig. 1(7) discloses the claimed oxidizing, since the Office relies upon it to disclose the claimed converting to a perovskite-type crystalline structure and claim 56 requires the converting to be separate from both oxidizing steps. Regardless, Applicant asserts that the Miyashita heating and sintering steps cannot be considered to disclose either of the claimed oxidizing steps.

Page 4, lines 26-29 and elsewhere throughout Miyashita describe that the processes begins with metal hydroxide and involves dehydrating the beginning material to a metal oxide. That is, at no point in the Miyashita process does any elemental metal exist in gel film 13 or crystalline metal oxide film 14. Instead, any metal present exists only as metal hydroxide or metal oxide, both being oxidized forms of metal. In contrast, claim 56 set forth forming a material over a substrate, oxidizing a first portion of the formed material, and converting at least a part of the oxidized first portion to perovskite-type. Miyashita does not disclose oxidizing gel film 13 or metal oxide film 14.

All of the metal present in gel film 13 is already oxidized when formed on the substrate. Accordingly, any oxidation that might be considered to occur during the pre-annealing step (heating and sintering) of Miyashita page 5, lines 25-42 to form crystalline metal oxide film 14 from gel film 13 would merely include oxidation of the

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hydroxide or organic polymer compounds. However, it is impossible to convert such compounds to a perovskite-type crystalline structure. Of course, it is entirely possible that no oxidation of any type occurs in the Miyashita process since no reference is made therein to oxidation. No other evidence exists within Miyashita or is proposed by the Office whereby a person of ordinary skill would conclude that the Miyashita pre-annealing step discloses oxidizing gel film 13 to crystalline metal oxide film 14. At least for such reasons, Miyashita additionally fails to disclose each and every limitation of claim 56.

At least for the indicated reasons, Applicant asserts that Miyashita does not anticipate claims 56. Claims 57-61 depend from claim 56 and are not anticipated at least for such reason as well as for the additional limitations of such claims not disclosed.

Claim 76 sets forth a method including, among other features, oxidizing a material formed over a substrate, forming a passivation layer over the material, and separately from the oxidizing, converting at least a portion of the oxidized material to a perovskite-type crystalline structure. As may be appreciated from the above discussion regarding the deficiencies of Miyashita as applied to claim 56, such reference fails to disclose the oxidizing and converting set forth in claim 76.

In addition, Applicant asserts that Miyashita fails to disclose the claimed formation of a passivation layer. Pages 4-5 of the Office Action allege that gel film 13 shown in Fig. 1(3) constitutes a passivation layer. Paragraph 31 and elsewhere throughout the specification states that oxides of amorphous silicon, aluminum, or alloys thereof are suitable examples of passivation materials along with other possible materials. The materials comprised by gel film 13 and crystalline metal oxide film 14

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are described in page 3, line 32 to page 4, line 13 of Miyashita. Noticeably, Miyashita does not include aluminum or silicon as possible elements to be comprised by gel film 13 or metal oxide film 14. Further, Miyashita does not provide any mention whatever of properties exhibited by gel film 13 or metal oxide film 14 that might reasonably lead a person of ordinary skill to believe that they constitute a passivation layer.

It is apparent from the express teachings of Miyashita that such reference does not contemplate any need for gel film 13 to function as a passivation layer. Such assertion is confirmed by description of the process used to form metal oxide film 14, in particular, page 4, lines 40-50. As described in paragraphs 30 and 31 of the present specification, one purpose of a passivation layer can be to prevent carbon and nitrogen incorporation into the material that will be oxidized in claim 76. Fig. 1(3) of Miyashita allegedly shows that gel film 13 is a passivation layer. However, formation of gel film 13 in Fig. 1(3) involves forming a sol composition over the structure shown in Fig. 1(2) and dehydrating the sol composition. Notably, Miyashita express states that the sol composition contains an organic polymer compound (that includes carbon). Possible organic polymer compounds preferably include some compounds that contain nitrogen, such as polyamide and polyamic acid.

Accordingly, formation of the metal oxide film 14 shown in Fig. 1(4) involves exposing the structure shown in Fig. 1(2) to materials containing carbon and/or nitrogen. It is thus clear from the express teachings of Miyashita that such reference does not disclose or even suggest that gel film 13 constitutes a passivation layer. The process used to form the supposed passivation layer clearly involves subjecting the underlying materials to possible carbon and/or nitrogen incorporation. The Office Action does not provide any other basis whereby gel film 13 might be considered a

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passivation layer. At least for such additional reasons, Miyashita does not disclose each and every limitation of claim 76 and does not anticipate such claim. Claims 77-80 depend from claim 76 and are not anticipated at least for such reason as well as for the additional limitations of such claims not disclosed.

Claims 62-67 stand rejected under 35 U.S.C. 102(e) as being anticipated by Gan. Applicant requests reconsideration.

Amended claim 62 sets forth a method including, among other features, depositing a material containing at least two metals and having a thickness of from about 3 to about 30 nm over a substrate, oxidizing the material, and, separately from the oxidizing, converting at least a portion of the oxidized material to a perovskite-type crystalline structure. Pages 5-6 of the Office Action allege that Gan discloses each and every limitation of claim 62. Applicant traverses.

Page 5 of the Office action alleges that compound layer 130 discloses the 3 to 30 nm thick two-metal containing material of claim 62 that is oxidized and converted to perovskite-type. However, review of Gan column 4, line 7-45 reveals that compound layer 130 is formed by deposition of a monolayer one atom thick that is subsequently oxidized. Only the crystalline metal oxide structure 200 is disclosed in Gan as containing more than one metal and the claimed thickness. Accordingly, Gan does not disclose the material containing at least two metals, as set forth in amended claim 62. The method of claim 62 exhibits unexpected advantages for two-metal containing materials as set forth in the present specification at least in paragraphs 20-23. At least for such reasons, Gan does not anticipate claim 62. Claims 63-67 depend from claim 62 and are not anticipated at least for such reason as well as for the additional limitations of such claims not disclosed.

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Claims 68-75 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Gan in view of Noguchi. Applicant requests reconsideration.

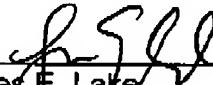
Amended claim 68 sets forth a method including, among other features, forming a material containing at least two metals and having a thickness of from about 3 to about 30 nm over a substrate, oxidizing the material, and, separately from the oxidizing, converting at least a portion of the oxidized material to a perovskite-type crystalline structure. As may be appreciated from the above discussion regarding the deficiencies of Gan as applied to claims 62-67, Gan fails to disclose or suggest every limitation of amended claim 68 and claims 69-75 depending therefrom. Noguchi fails to remedy the deficiencies of Gan. Applicant requests allowance of such claims in the next Office Action.

Claims 56-81 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-49 of U. S. Patent No. 6,730,575. Applicant herewith submits a timely filed terminal disclaimer overcoming the double patenting rejection.

Applicant herein establishes adequate reasons supporting patentability of claims 56-81 and requests allowance of all such pending claims in the next Office Action.

Respectfully submitted,

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